NAME:

1. 10 pts. each Give the domain of each function in interval notation.

   (a) $q(x) = \dfrac{x+4}{x^3 + 4x^2}$

   (b) $v(t) = \dfrac{-t}{\sqrt{-t-5}}$

2. 10 pts. each Let
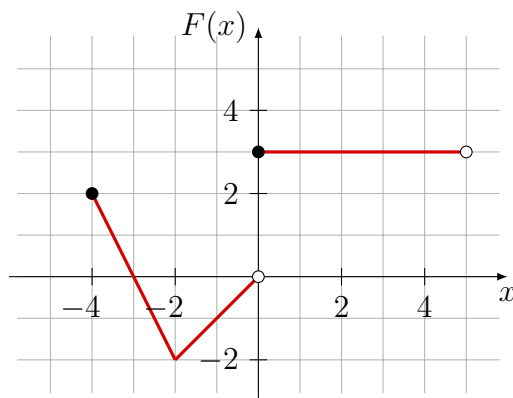$$f(x) = \frac{3}{2x} \quad \text{and} \quad g(x) = \frac{x+1}{x-1}.$$
   (a) Find $(f - g)(x)$, and give its domain in interval notation.

   (b) Find $\left(\dfrac{f}{g}\right)(x)$, and give its domain in interval notation.

3. 10 pts. If $f(x) = 3x^2 - Cx + 9$ and $f(-1) = 16$, what is the value of C?

4. 10 pts. each Consider the piecewise-defined function F having graph given below.

   (a) Give the domain and range of F in interval notation.

   (b) Write a definition for F.

5. 10 pts. Find algebraically the points of intersection of the graphs of the functions
$$f(x) = x^2 + 5x - 3 \quad \text{and} \quad g(x) = 2x^2 + 7x - 27.$$

6. 10 pts. Find the vertex of the quadratic function $f(x) = 2x^2 + 5x + 3$, then give the range of the function in interval notation.

7. 10 pts. A landscape engineer has 200 meters of border to enclose a rectangular pond. What dimensions will result in the largest pond?

8. 10 pts. Find the complex zeros of $P(x) = x^2 + 6x + 1$ using the quadratic formula.

9. 10 pts. Solve the equation $|x^2 + x| = 12$.

10. 10 pts. Solve the inequality $|4x - 1| - 20 < -13$, giving the solution set in interval notation.